SEAMLESS

Project title	Safe, Efficient and Autonomous: Multimodal Library of European Shortsea and inland Solutions		
Project acronym	SEAMLESS		
Project number	101096923		
Project start date	01/01/2023	Duration	48 months

D1. 2 – PROJECT QUALITY AND RISK MANAGEMENT

Due date	31/03/2023	Delivery date	31/03/2023
Work package	WP1		
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Version	1.0		
Dissemination level	Public		

VERSION AND AMENDMENTS HISTORY

Version	Date (MM/DD/YYYY)	Created/Amended by	Changes
0.1	25/02/2023	Alexandros Rammos (NTUA)	Table of Contents and Document Structure
0.2	23/03/2023	Konstantinos Louzis (NTUA), Elias Kotsidis (ESI)	Section 1-5 descriptions
0.3	28/03/2023	Odd Erik Mørkrid (SO)	Review and comments
1.0	31/03/2023	Alexandros Rammos (NTUA)	Consolidation and final version

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List of Abbreviations

Abbreviation	Description
DL	Deliverable Leader
EC	European Commission
FMEA	Failure Mode and Effects Analysis
PC	Project Coordinator
PMR	Periodic Management Report
PO	Project Officer
PR	Project Reviewers
QM	Quality Manager
QR	Quality Reviewer
ROC	Remote Operation Centre
TL	Task Leader
WP	Work Package
WPL	Work Package Leader

EXECUTIVE SUMMARY

This document describes the project's quality management procedures that apply to SEAMLESS design, implementation, and pilot demonstration stages. The close following and compliance to the Quality and Risk Management Plan is a joint responsibility of all project partners until the complete discharge of all obligations under the European Commission (EC) Grant Contract, in order to ensure the quality of all project deliverables and the following of coordination guidelines among partners during project's tasks execution. The plan presented hereafter consists of planned and systematic processes and steps to determine and ensure the achievement of the SEAMLESS quality objectives. Moreover, it is going to be used to monitor the corrective actions employed and to verify that agreed procedures are in place and are being adequately implemented. To this end, this document identifies a list of Key Performance Indicators (KPIs) that will be used and continuously updated throughout the duration of the SEAMLESS project, in order to monitor the progress and also the quality of the work performed in various executed tasks. Moreover, a list of the major identified risks related to the project operation has been created (and will be maintained and updated throughout the project's course), accompanied with adequate mitigation strategies.

The document is structured as follows:

Section 1 is an introductory section that outlines the purpose of the document.

Section 2 discusses the quality reviewing activities that have been designed for the quality assurance of the project deliverables.

Section 3 describes the configuration management activities that will take place within SEAMLESS for each deliverable.

Section 4 presents in detail the Quality Attributes and the KPIs that were set for the SEAMLESS project, in order to assess the quality of the project results. At the same time, it introduces an early, but detailed description of the major risks envisaged for the project operation, together with the proposed mitigation strategies.

1 INTRODUCTION

1.1 BACKGROUND

Deliverable D1.2. SEAMLESS Project Quality and Risk Management Plan is part of WP 1 "Project Coordination and Strategic Steering".

1.2 PURPOSE AND SCOPE

The purpose of this document is the description of the quality procedures that will be applied during the project's implementation stages. The consortium is committed to a high quality of project processes and deliverables to achieve reliable results within the defined scope, schedule, and budget. Compliance to the Quality Management Plan is a joint responsibility of all project partners until complete discharge of all obligations under the EC Grant. Quality will be ensured by implementing quality management procedures and appointing a Quality Manager (QM), who will be responsible for monitoring and advising partners on quality procedures and ensuring conformity to standards.

The Quality Management Plan ensures the quality of all project deliverables and the proper risk management, assuring coordination activities among partners during the tasks' execution. The Quality Management Plan defines procedures and quality KPIs that the QM will monitor throughout the project. Each Work Package Leader (WPL) will be responsible for the quality of results and deliverables of its WP; the latter will be subject to a peer review by the QM and two other reviewers from the partners not authoring the specific deliverable. In more detail, the objectives of the Quality Management Plan are to:

- Structure: defining the quality management structure and processes adopted;
- Input: clearly defining the strategic goals, milestones, ensuring realistic schedules and sufficient resources;
- Output: implementing an effective internal and external information and communication system, decision making process, documenting intermediate and final results (e.g., software, solutions, tools);
- Feedback: monitoring of the quality of processes and results, keeping the project on schedule and budget;
- Implementation: appointing the responsible body with the authority to take and implement decisions on the necessary corrective measures (QM, PC and WPL) and ensuring the commitment of partners.

Practices defined in this plan will ensure that quality is integrated into SEAMLESS working processes. Therefore, the plan consists of planned and systematic activities to determine and ensure achievement of the SEAMLESS quality objectives.

1.3 INTENDED READERSHIP

This deliverable is confidential and intended for a readership comprising the members of SEAMLESS consortium and the SEAMLESS Project Officer. It will be disseminated internally within the project only. The plan set out in this document will govern the actions of all project partners throughout the

project duration. It is therefore important that all partners have access to it and a possibility to consult it at all times.

1.4 DOCUMENT STRUCTURE

The structure of this document is as follows:

Section 2 discusses the quality reviewing activities that have been designed for the quality assurance of the project deliverables.

Section 3 describes the configuration management activities that will take place within SEAMLESS for each deliverable.

Section 4 presents in detail the Quality Attributes and the KPIs that were set for the SEAMLESS project, in order to assess the quality of the project results. At the same time, it introduces an early, but detailed description of the major risks envisaged for the project operation, together with the proposed mitigation strategies.

Figure 1 Text black

2 QUALITY REVIEW WITHIN SEAMLESS

The QM (NTUA) serves as the contact point for the Project Coordinator and all SEAMLESS partners on all SEAMLESS quality matters.

Within the SEAMLESS project, the review of the project deliverables will be conducted as described in the following sub-sections.

2.1 REVIEWS FOR DOCUMENTATION – DELIVERABLES

Each project deliverable is assigned to one leading responsible partner (Deliverable Leader, DL), as described in the SEAMLESS Description of Action (DoA). A detailed list of Work Package leaders (WPL) and Task Leaders (TL) is presented in D1.1 (Project Administrative and Financial Management Plan). The DL takes the responsibility that the deliverable is of high quality and timely delivered. The DL also assures that the content of a deliverable is consistent with the work performed related to the deliverable and that the objectives related to the goals of the project are met. Any issues related to deliverables, endangering the success of the work package or the project, must be reported by the WPL immediately to the project management and discussed within the Coordination team.

Project documentation will be reviewed against the following criteria:
- Format of the document according to the document templates.
- Consistency with previous relevant documentation (for example, technical specifications combined with the requirements definition).
- The methodology of the work, development, trial, experiment or study conducted is in a manner appropriate to the task.
- The results are realistic, useful and actionable and the deliverable is useful to downstream tasks.
- Technical aspects of the documentation will be reviewed from the Technical Committee, in order to ensure that the document meets the technical goals of the project, and that all technical information is advancing the current state-of-the-art and the recent technological research level.
- The conclusion of the deliverable makes sense.
- Identification of plagiarism, inappropriate authorship credit, data falsification, image manipulation.
- Appropriate citation.

Other criteria:
- Identification and correction of typing mistakes, spelling or grammar mistakes that may cause misunderstanding.
- Consistency with DoA, to ensure that the deliverable reflects the DoA.
- The structure of the document is logical and easy to follow.
- Figures and tables are legible and referred to in the text.
- The length of the deliverable's main body is consistent.
- The references of the papers and other sources used are correct.
- Terms and abbreviations are all defined.
- Any mathematical or other symbols used in the document are sufficiently defined.

The general procedure and timeline for the review project documentation is described in the following paragraphs (see also Figure 1).

The DL drafts a Table of Contents (ToC), assigns tasks to all involved partners and sets the respective deadlines. Involved partners provide their feedback within the deadlines and the responsible partner prepares the first draft of the document (v0.1). This draft is sent to the WPL for comments and improvements / additions. The feedback period for the first draft lasts at least five working days. Feedback is sent directly to the Deliverable Leader who revises the document, prepares the semi-final version (v0.2), and sends it back to the WPL.

The Quality Control Process begins based on the semi-final version (v0.2) of the deliverable. At least two Project Reviewers (PR), who ideally are not members of the authoring team but have expertise in relation to the deliverable, have been assigned in advance. Each deliverable will be submitted by the DL to the QM, who will forward it to the appointed reviewers for peer review. The PRs send their comments to the Quality Manager (QM), either in tracked changes on the digital document or (if not otherwise possible) using a review form, who consolidates and checks the comments and sends them to the DL. The DL then improves the document based on their comments. In case the comments / suggestions cannot be realised, the reasons for this must be documented. If necessary

(i.e. if there are too many comments on the first round), another round of comments from the PRs takes place.

The final version (v1.0) that is prepared by the DL is then submitted for a final round of comments to the Project Coordinator (PC). If there are comments, the DL addresses them appropriately and prepares the final version of the document, which is sent to the coordinator. The PC final delivers the final version to the Project Officer (PO) and the EC.
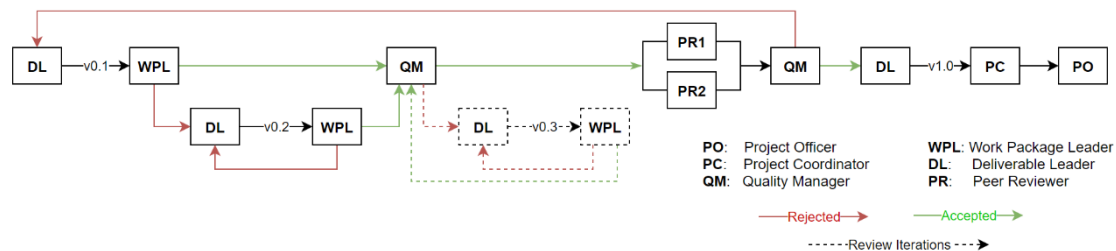

Figure 2 Schematic view of deliverable's submission.

2.2 REVIEWS FOR DISSEMINATION MATERIAL

Dissemination material, such as leaflets, newsletters, conference presentations, and scientific publications will undergo a quality check by the Executive Board, that consists of the Project Coordinator (NTUA), the Dissemination Manager (PNO), the Ethics and Data Manager (NTNU), and the Technical Manager (SO), before their actual publication. This review process aims for quality, fairness, transparency and maximization of impact. The Executive Board will review the submissions and verify that:

- The quality is at the expected level.
- The contents have proper references to the work conducted by the partners and no information which may require clearance from the partners (especially the industrial ones).
- In case there are issues, the board should be able to properly justify its decisions.

2.3 DELIVERABLE ASSIGNMENTS FOR THE PEER-REVIEWED PROCESS

The relevant reviewers for each deliverable will be assigned by the WPL in collaboration with the DL. The reviewer should be notified at least one (1) month prior to the submission of the deliverable. In addition, the reviewer to be assigned should not participate in the deliverable as a contributing partner.

3 CONFIGURATION MANAGEMENT

Configuration Management deals with the overall project consistency, identification and tracking of changes related to all project results, including the deliverables, documents, testing procedures and any other related activity. The QM (NTUA) will be responsible for the overall monitoring of all configuration management activities described in this section.

3.1 DOCUMENT CONFIGURATION MANAGEMENT

Configuration management will be ensured through version tracking and history of changes of the various project documents, including the following:

- Deliverables (as stated in the deliverables list in the SEAMLESS Grant Agreement)
- Meeting minutes
- Reviewed documents

Document history will be tracked in each deliverable in a separate table, describing the different versions of the document and the reasons of change/updates on it. Each deliverable main author will be responsible for updating this.

Document versioning will be tracked through the monitoring of the Configuration Matrix, in which all versions of each document will be tracked. Also, this table will be updated by each document author.

In the following subsections, the document naming conventions to be followed in SEAMLESS are analysed.

3.2 DELIVERABLES NAMING

Table 1 presents the convention followed for naming the project's deliverable documents.

Table 1 Deliverable naming scheme.

Coding:	SEAMLESS [Deliverable Code] vA.B
A:	S/n for major release of the deliverable (Submission to Commission)
B:	S/n for updates during the preparation phase
Example	SEAMLESS D.12.1 v1.0 (for submission to the Commission)
	SEAMLESS D.12.1 v0.9 (for internal updates and submission for internal review)

3.3 DELIVERABLES REVIEW NAMING

The naming convention in Table 2 will be used for the reviewed deliverable document (comments & track changes on the existing document) or the Review Form.

Table 2 Deliverable review naming scheme.

Coding:	SEAMLESS [Deliverable Code] vA.B -TR-[Company]
	SEAMLESS [Deliverable Code] vA.B -QR-[Company]
A:	S/n for major release of the deliverable (Submission to Commission)
B:	S/n for updates during the preparation phase
TR:	Technical Reviewed document
QR:	Quality Reviewed document
Example	SEAMLESS D.1.1 v0.3-TR-NTUA v0.5
	(Technical Reviewed Document from technical manager)
	SEAMLESS D.1.1 v0.4 -QR-NTUA v0.6
	(Quality Reviewed Document from technical manager)

3.4 MEETING MINUTES

Table 3 presents the naming convention followed for a meeting minutes document:

Table 3 Meeting minutes naming scheme.

Coding:	SEAMLESS [Type of Meeting] Minutes Date(s) @Place vA.B
A:	S/n for major release of the document
B:	S/n for updates during the preparation phase
Date:	Date(s) the meeting was held. Format DDMMYYYY
Place:	Place where meeting was held
Example	SEAMLESS Kick-Off Meeting Minutes 26072020 @Athens/Virtual v1.0

3.5 E-MAILING CONVENTIONS

Electronic mail will be an important means of exchanging information in the SEAMLESS project. All e-mail subject headings **must start** with the text "[SEAMLESS]". Additional tags can be added to specify relevant work packages, tasks, and deliverables, where appropriate and **if deemed useful**. The tags should never contain spaces within the square brackets.

Some examples of email subject headings are:

- [SEAMLESS] [WP6] Title
- [SEAMLESS] [WP1] [Task1.2] [D1.4] title…….. document
- [SEAMLESS] [WP2] Title
- [SEAMLESS] [WP4] [Task4.3] Title

4 QUALITY ATTRIBUTES AND KEY PERFORMANCE INDICATORS

4.1 QUALITY ATTRIBUTES

To assess the quality of the project results, in general, several qualitative attributes will be used based on the nature of the SEAMLESS project and the characteristics of its end-users, as well as the "context of use" of project results.

On the other hand, quality is also addressed by ensuring the compliance of all the project activities to the *development process*. The main attributes that address this need are:

- Planning accuracy
- Rework occurrence
- Conformity to methodologies
- Redundancy

All these attributes will play an important role in the measurement of the project Key Performance Indicators (KPIs) described in the following section.

4.2 KEY PERFORMANCE INDICATORS

Monitoring of the progress of the project objectives will be done by the Technical Manager (SO) and the PC (NTUA), through KPIs. These KPIs will be monitored bi-annually and the relevant KPIs will be presented in the project's Interim Report and in the Periodic Management Report (PMR). The metrics included in Table 4 will be used as the starting point.

Table 4 Initial Key Performance Indicators (KPIs).

KPI	Goal (Justification and Goal)
Real month of milestone achievement / due month	Keep the project on schedule (KPI=1). Six-Monthly internal activity reports are compiled and consolidated (Process described in D 1.1). **Target**: KPI>=1 , per milestone
Overall project risk level	Flag any deviations from targets in advance to allow preventive action. **Target**: Risk level below moderate
Real month of deliverable submission / Due month	Ensure compliance with task and deliverable performance procedures. **Target**: KPI<=1, per deliverable
Number of reviewers per deliverable / assigned reviewers	All deliverables undergo at least a two-phase review procedure: review by two appointed reviewers (coordinated by the QM) and by the GA (coordinated by the PC). Ensure that all deliverables follow defined quality criteria. **Target**: KPI>=1
Actual number of meetings / Scheduled meetings	Maintain coherence and focus of the consortium, monitor project progress and decisions made, synchronise activities, discuss technical, administrative and other issues regularly. Scheduled General Assembly meetings 2-3 times/year. Scheduled WPLs meetings at least 4 times/year. **Target**: KPI >= 1
Creation of a recognisable brand identity	1 project logo, brand guidelines, SEAMLESS templates, illustrations and graphics.
Communication kit	2 brochures, 3 posters, 5 Roll-up banners, 1 interim video, 1 final video, 8 e-Newsletter issues.
Dedicated website	1 public website
Participation in Conferences and events	At least 2/year and 12 presentations in total; 2 special sessions; 2 stands and/or demonstrations;
Peer-reviewed publications	At least 6 project papers in conferences; 2 publications in re-known scientific journals;
Mass Media &Press	20 media articles in popular and/or specialised media; At least 1 interview in Radio and/or TV
Use of EU dissemination networks & tolls	At least 4 publications in EC communication tools; Participation in EU events
Project Events	2 pilot demonstrations; 1 intl. conference; Clusters sessions at a yearly base.

KPI	Goal (Justification and Goal)
SEAMLESS Networking/ Engagement activities	At least 30 members of the Stakeholders Community; at least 100 stakeholders contacted during the project; establish links with 10 R&D projects and 10 associations, fora, technical committees.

4.3 RISK MANAGEMENT

In SEAMLESS, risks are considered as an integral part of the workplan. The complexity of the problem at hand and the trans-disciplinary nature of the consortium add to the number of risky aspects that may cause issues in the project execution lifecycle. However, all these issues are tackled a priori by exploiting the accumulated project implementation experience of partners and by applying a well laid-out management scheme.

SEAMLESS Risk management is a circular/iterative process, in which risks are identified, analysed, managed and monitored. As described in D1.1 (SEAMLESS Project Administrative and Financial Management Plan), the SEAMLESS risk management process is implemented by the Risk Manager (ESI). The Risk Manager is responsible for continuously monitoring project risks, by updating the SEAMLESS risk register, and drafting an appropriate mitigation strategy for unacceptable risks. The elements of the SEAMLESS risk management process are outlined below.

Risk identification. Everyone involved in the project needs to be aware of their contribution to the project objectives and what might prevent them from delivering it. The risks will be reviewed at regular intervals to restate current priorities, as project priorities may shift over time (deadlines, budget re-forecasts, and performance expectations) and unforeseen difficulties might arise.

Risk analysis. SEAMLESS will use estimates of likelihood and impact against the key risks. SEAMLESS will try to quantify risks wherever possible, by using a scoring system to ensure comparison of risks. The quantification of project risks will be performed considering the most likely outcome scenario for all identified risks.

Risk management. Risk responses in SEAMLESS will fall under one of the types: a) Avoid the risk: This can be done by avoiding use of technologies feasible alternatives exist; b) Mitigate the risk: If a risk cannot be avoided, management will try to reduce the risk, by making it either less likely or less consequential. This will include the development of contingency plans for those risks which cannot be avoided; c) Accept or retain the risk: Inevitably there will be some risks that are intrinsic in the nature of the work being undertaken and which it is not possible to mitigate, control or avoid because the time and cost involved is too high to justify the benefits. The number and impact of these sorts of risks in the SEAMLESS project are minimal.

Risk monitoring. SEAMLESS will run a well-maintained risk register for monitoring risk-management performance. The registry defines mitigating actions for each risk, citing who will do what and by when.

Risk Contingency Plans. To monitor and minimize SEAMLESS risks, the consortium will prepare a list of risks and propose contingency plans as early as possible. Table 6 in the Appendix presents an initial identification of the main risks and the proposed risk mitigation measures, as described in the SEAMLESS GA.

More specifically a Failure Mode and Effects Analysis (FMEA) process will be applied, and quality risk levels will be assigned to each step in the design and manufacturing of SEAMLESS technologies. This will allow the consortium to anticipate risks at an early stage and implement countermeasures ahead of time.

Failure Mode and Effects Analysis is a systemized approach used for eliminating risk events during product development or for quality improvement activities. Risk event modes are the ways in which a process can fail. Effects are the ways that these Risk events can lead to waste, defects, or catastrophic outcomes for the customer. As such, Failure Mode and Effects Analysis approach is designed to identify, prioritize, and limit these Risk Event modes.

As with many powerful techniques, the strength of FMEA, applied to SEAMLESS, will be derived from a cross-functional, partner-based approach. The word potential is often placed ahead of FMEA in order to highlight that the tool is best utilized early in a product's concept/development phase, in order that Risk Event is averted in service or during manufacture.

At first a spreadsheet will be used to document the completed FMEA for SEAMLESS project. Within this spreadsheet specific assigned columns will be used which are briefly presented below:

- **FMEA ID #**: This column assigns an identification number for internal use
- **Item/Function**: This column identifies the subsystems (components) of SEAMLESS technologies along with their functions.
- **Potential Risk Event**: A risk event is defined as the way the item could potentially fail to meet the function intent. In other words, what can go wrong?
- **Potential Risk Event Impact**: A Risk Event impact is defined as the result of a Risk Event on the function of the product/process as perceived by the customer (internal and external customers). Examples of Risk Event impacts are: inoperability of the product, degraded performance etc. Note that Risk Event impacts should be identified for each Risk Event.
- **Work Package #:** This column indicates the related project work package.
- **Severity (S)**: This column indicates how serious the potential Risk Event is. A numerical value, S, is assigned to the severity of the Risk Event. This value is in the range of 1 to 5, 1 being the lowest impact on product function or process output, and 5 being the highest (Table 5).
- **Potential Causes for Risk Event**: A cause of Risk Event is defined as a design weakness which may result in a Risk Event. Note that all potential root causes need to be identified for each Risk Event.
- **Probability (P)**: This column indicates how likely (or often) it is that the cause of Risk Event will occur. A numerical value, P, is also assigned to the occurrence which ranges from 1 to 5 (Table 6).
- **Current Process Controls**: For each potential cause of Risk Event, this column identifies current tests or mechanisms in place to prevent the cause of the Risk Event from occurring or which detect the Risk Event before reaching the customer.
- **Detection Rating**: It estimates how well the controls in place can detect either the Risk Event cause or its mode. The detection rating is on a scale of 1 to 6 where 1 means the control is certain to detect the problem and 6 means the control is absolutely certain not to detect it (see Table 7).
- **Risk Priority Number**: In this column, the risk priority number is evaluated for each cause of Risk Event, by multiplying the severity by the probability by the detection rating as follows:

RPN = (Severity)*(Probability)*(Detection)

The RPN number, along with the risk level (see Figure 2) provides guidance for ranking potential Risk Events in the order they should be addressed.

- **Risk Level:** Risk is the combination of likelihood of occurrence and severity. Risk levels can be selected based on a Risk Matrix as shown in Table below. It is clear that the higher the risk level, the more justification and mitigation is needed to provide evidence and lower the risk to an acceptable level.
- **Mitigations/Requirements:** This column indicates the recommended actions taken to mitigate each potential Risk Event cause. Note that these actions may be design or process changes in order to lower severity or the likelihood of occurrence. This column can also include additional controls to improve Risk Event detection.
- **Responsibility/Target Date:** Responsibility and target completion date need to be assigned in this column. This makes responsibility clear-cut and facilitates tracking.
- **Actions taken:** This column indicates the actions taken. After these actions have been taken, severity, S, probability, P, and detection, D, need to be re-assessed and consequently, the risk priority number and the risk level re-evaluated. Based on the revised risk priority number and the risk level, the outcome is determined: either close the action or to require further actions.

Table 5 The scale of severity rating S.

Severity (S)	Meaning
1	Negligible, no relevant effect on reliability
2	Minor, affects very little of the system
3	Moderate
4	Critical, causes a loss of primary function
5	Catastrophic, item becomes inoperative

Table 6 The scale of the probability ranking P.

Probability (P)	Meaning
1	Extremely Unlikely
2	Remote (relatively few Risk Events)
3	Occasional (occasional Risk Events)
4	Reasonably Possible (repeated Risk Events)
5	Frequent (Risk Events are almost inevitable)

Table 7 The scale of the detection rating D.

Detection Rating (D)	Meaning

1	Detection method is highly effective, and it is almost certain that the risk will be detected with adequate time.
2	Detection method has moderately high effectiveness.
3	Detection method has medium effectiveness.
4	Detection method is unproven or unreliable; or effectiveness of detection method is unknown to detect in time.
5	There is no detection method available or known that will provide an alert with enough time to plan for a contingency.

P/S	1	2	3	4	5
5	Moderate (5)	High (10)	High (15)	Unacceptable (20)	Unacceptable (25)
4	Low (4)	Moderate (8)	High (12)	High (16)	Unacceptable (20)
3	Low (3)	Moderate (6)	Moderate (9)	High (12)	High (15)
2	Low (2)	Low (4)	Moderate (6)	Moderate (8)	High (10)
1	Low (1)	Low (2)	Low (3)	Low (4)	Moderate (5)

Figure 3 Risk Matrix.

The next step is for each Work Package Leader to compile the risks associated with their tasks and to assign responsibility for these actions and set target completions dates. Once corrective actions have been completed, SEAMLESS partners will reassess and record the severity, probability of occurrence and likelihood of detection for the high priority Risk Events. This is so that the effectiveness of the corrective action taken can be determined. This activity within the partners is planned for the upcoming months of the project.

4.3.1 Consortium Risk Management

The SEAMLESS consortium has considered consortium-related risks that deal with (1) underestimation of some tasks, (2) low productivity and (3) low quality of work. These risks are already minimised during the selection of partners, which most of them have been selected following specific criteria:

- They are leaders in their areas of expertise;
- They are selected after previous successful cooperation, with coordinator or with other trusted members of the consortium;
- They all have evidence of long history of successful completion of research projects.

However, these risks will be minimized and managed by using established methodologies for hardware/software cost estimation, continuous project planning, monitoring and control. Such methodologies are standard practice in the professional work of the consortium partners. To this end, timely awareness of and reaction to potential problems will be crucial to effective risk management.

4.3.2 Risk Register

This Risk Register will be updated bi-annually and will be presented in the Interim Reports and in the PMRs. The risks will be quantified within Task 1.3 "Quality assurance and risk management".

5 SUMMARY

This report presents quality management procedures that apply to the SEAMLESS project. To accurately describe the quality management plan that is implemented in the project, all aspects of the reviewing process, both regarding deliverables and dissemination activities, have been presented. To achieve the consistency of this process, document configuration guidelines that include naming, structure of the meetings minutes, etc., have been developed. KPIs will additionally be developed to ensure the proper monitoring and evaluation of the project progress, while the initial KPIs have been described in this report. Moreover, an initial list of the major identified risks related to the project implementation has been created (and will be maintained and updated throughout the project's course), accompanied with adequate mitigation strategies.

REFERENCES

N/A

APPENDIX A

Table 8 includes the SEAMLESS deliverables.

Table 8 Deliverables

Deliverable No.	Deliverable Name	WP No.	Lead Beneficiary	Type[1]	Dissemination Level[2]	Due Date Month	Due Date Actual
D1.1	Project Administrative and Financial Management Plan	1	NTUA	R	PU	3	Mar-23

Deliverable No.	Deliverable Name	WP No.	Lead Beneficiary	Type[1]	Dissemination Level[2]	Due Date Month	Due Date Actual
D1.2	Project Quality and Risk Management	1	NTUA	R	PU	3	Mar-23
D1.3	Data Management Plan	1	NTNU	DMP	PU	6	Jun-23
D1.4	Data Management Plan - Rev 1	1	NTNU	DMP	PU	18	Jun-24
D1.5	Data Management Plan - Rev 2	1	NTNU	DMP	PU	36	Dec-25
D1.6	Data Management Plan - Rev 3	1	NTNU	DMP	PU	48	Dec-26
D1.7	Knowledge and IPR management Plan	1	NTUA	R	SEN	6	Jun-23
D2.1	State-of-the-art and baseline for the SEAMLESS Use Cases	2	ISL	R	PU	8	Aug-23
D2.2	SEAMLESS reference logistics architecture, standards, and simplified administrational procedures	2	DST	R	PU	20	Aug-24
D2.3	Concept of Operations and requirements for SEAMLESS Building Blocks	2	SO	R	PU	20	Aug-24
D2.4	Comparative law analysis of existing legal frameworks and roadmap of recommendations	2	VNF	R	PU	36	Dec-25
D3.1	Specifications and design of SEAMLESS Building Block #1: Autonomous mooring and cargo handling (DockNLoad)	3	MCGFI	R	PU	40	Apr-26
D3.2	SEAMLESS Automated stowage planning system	3	MCGFI	DEM	PU	30	Jun-25
D3.3	Concepts for improved port cargo handling through automated port interfaces	3	VPF	R	PU	40	Apr-26
D3.4	Safe and secure autonomous mooring and autonomous port cargo handling	3	NTUA	R	PU	40	Apr-26

Deliverable No.	Deliverable Name	WP No.	Lead Beneficiary	Type[1]	Dissemination Level[2]	Due Date Month	Due Date Actual
D3.5	Autonomous Vessels Smart Port Manager	3	AWAKE.AI	DEM	PU	20	Aug-24
D4.1	Preliminary Assessment of Zero-Emission power plant configurations	4	ESI	R	PU	18	Jun-24
D4.2	Autonomous GNC Scheme development and monitoring agent prototype	4	TUD	R	PU	36	Dec-25
D4.3	Vessel Prototype concepts & Framework for risk-based approval	4	SO	R	PU	36	Dec-25
D4.4	Interfaces towards SEAMLESS logistics and port services and HAI for ROC fleet operation- design & prototype	4	KMNO	R	PU	36	Dec-25
D4.5	"Low attention" autonomous vessel operation by improved equipment operation incl. GNSS- GAP analysis & design	4	KMNO	R	PU	36	Dec-25
D5.1	ModalNET Specifications, systems architecture, and design of cyber-secure communication	5	VPF	R	PU	14	Feb-24
D5.2	Framework and methods for the ModalNET computational engine	5	NTUA	R	PU	24	Dec-24
D5.3	ModalNET logistics network digital twin	5	VPF	DEM	PU	38	Feb-26
D6.1	Outlook on Key Performance Indicators for use cases	6	NTUA	R	PU	12	Dec-23
D6.2	Financial and economic analysis for SEAMLESS building blocks	6	PNO	R	PU	44	Aug-26
D6.3	Societal and environmental impact	6	NTUA	R	PU	28	Apr-25

Deliverable No.	Deliverable Name	WP No.	Lead Beneficiary	Type[1]	Dissemination Level[2]	Due Date Month	Due Date Actual
	for SEAMLESS building blocks						
D6.4	Business models guidelines for autonomous freight feeder loop services	6	VPF	R	PU	48	Dec-26
D6.5	Skills and competences for autonomous waterborne freight feeder loop services	6	VNF	R	PU	40	Apr-26
D6.6	Pan-European impact of the fully automated SEAMLESS feeder loop service	6	DST	R	PU	44	Aug-26
D7.1	SEAMLESS validation plan	7	SO	R	PU	26	Feb-25
D7.2	SEAMLESS overall integration plan	7	SO	R	PU	30	Jun-25
D7.3	Evaluation Report of Northern & Central European Case	7	SO	R	PU	40	Apr-26
D7.4	Component and system evaluation and future recommendations	7	NTUA	R	PU	48	Dec-26
D8.1	Project logo and set of public document templates	8	PNO	DEC	PU	2	Feb-23
D8.2	Public project website	8	PNO	DEC	PU	3	Mar-23
D8.3	D&C Plan set-up and updates	8	ALICE	R	PU	3	Mar-23
D8.4	D&C Plan updates – Rev 1	8	ALICE	R	PU	12	Dec-23
D8.5	D&C Plan updates – Rev 2	8	ALICE	R	PU	24	Dec-24
D8.6	D&C Plan updates – Rev 3	8	ALICE	R	PU	42	Jun-26
D8.7	SEAMLESS dissemination video	8	PNO	DEC	PU	6	Jun-23
D8.8	SEAMLESS Exploitation and IP strategy – first report	8	PNO	R	PU	24	Dec-24

Deliverable No.	Deliverable Name	WP No.	Lead Beneficiary	Type[1]	Dissemination Level[2]	Due Date Month	Due Date Actual
D8.9	SEAMLESS Exploitation and IP strategy – final report	8	PNO	R	PU	45	Sep-26
D8.10	SEAMLESS dissemination video - Final	8	PNO	DEC	PU	42	Jun-26

APPENDIX B

Table 9 lists the major risks that have been initially identified and are part of the SEAMLESS GA and the proposed mitigation strategies.

Risk No.	Description of Risks	WP No.	Proposed risk mitigation measure
1	Underperforming partner	All	All consortium partners are committed to the project. Grace periods are foreseen initially. The flexible project management structure and CA allow a shift of resources to alternative project
2	Partner leaving the project	All	The consortium features overlapping coverage in critical areas of expertise. The management structure allows inclusion of new partners.
3	Key-person left or is temporarily unavailable	All	Key partners are involved with more than one experienced staff member, ensuring an immediate substitution.
4	Needed partners' resources are underestimated	All	The project management bodies will analyse the following possibilities to ensure that planned work is completed: (1) re-arranging resources among the partners as needed, (2) committing internal resources of organizations in project activities, and (3) re-planning work on activities.
5	Project schedule is partly not appropriate	All	The will monitors performed work vs. project plan and performs corrective actions if necessary. In crucial cases, PC will work on the plan adaptation in coop with EC.
6	Project milestones or deliverables are delayed	All	In the scope of project management monitoring activities, detailed analysis will be done on both global project and lower project implementation levels. Such cases will be recognized in early stages, ensuring timely and effective implementation of necessary corrections in the work plan.
7	Low technical quality of deliverables	All	Addressed through regular quality and peer reviews

8	Agreement among partners is difficult to achieve	All	Collaboration in the consortium targets consensus among partners on the open issues. However, to avoid long consensus making processes, which might affect the project plan, the management procedures for decision making and conflict resolution will be timely applied
9	Not satisfactory interaction among WP's and tasks	All	Synchronization of work among WP's, so that these cases not occur or are timely recognized allowing corrective actions without significant impact on the project.
10	Necessary coordination level is not achieved	All	The project coordination will be observed closely. If needed, the management bodies will propose the corrective actions improving overall coordination.
11	IPR related problems	WP1	The Consortium Agreement will establish a legal framework for the project to provide clear regulations for issues within the consortium about the ownership of IP
12	Inadequate project management	WP1	A complete and systematic project management plan, along with appropriate allocation of work and tasks to project members, minimise this risk.
13	Problems in integrating components in a common platform	WP7	An iterative approach implementation, with continuously updated versions of the prototypes and phases to ensure efficient integration
14	Robustness of technical components in real-world environmental conditions affects system modules' testing	WP3-5	The technical developments will be closely monitored, ensuring that issues related to the robustness of modules will be detected early. Corrective measures will include slight simplification of the scenario to lower the importance of the underlying component shifting the focus on the interaction of other modules or equivalent
15	The performance of the deployed services is lower than expected	WP3-5	will be mitigated by (a) slightly adjusting the environment and configuration to get better acceptability metrics, (b) simplify scenarios to include more easily recognizable states, (c) ask users to provide additional information through handy online questioners
16	Developed technologies are of low accuracy	WP3-5	Early tests will reveal the level of the representation granularity that is most useful for the tasks at hand, also allowing refinements to the approach followed; partners have demonstrated capability to deliver alternative and more efficient solutions if needed.
17	Prototype Architecture not compatible with Pilot sites	WP2,7	While the baseline architecture is defined relatively early this will be revised in the integration phase

18	Usability/interfacing obstacles reported by involved end users	WP2,7	While the partners tasked with implementing the platform's interfacing have great expertise on the design of interfaces, it may happen that users find **SEAMLESS** hard to use or obtrusive in nature. The iterative approach for the development of the platform will allow the consortium to consider this early feedback and adjust its approach accordingly.
19	Difficulties in validating defined KPIs	WP2,6	To ensure validation of **SEAMLESS** KPIs, these will be considered when defining testing specifications and during all evaluation activities.
20	Global events (e.g., pandemics, conflicts) obstruct the demonstration cases	WP7	As the COVID-19 pandemic has shown, this is a critical risk. Nevertheless, the consortium will continue working on the technical evolution and monitoring of the pilots remotely; on-site demonstrations will be resumed once the situation normalises